GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, JANUARY 30, 1889.

TABLE OF CONTENTS.

PAGE.

EDITORIAL ARTICLES:—The Nation's Forests.—Concerning Elizabethan Architecture.—Alexander Hamilton's Trees on Washington Heights..... 49
White Huckleberries.....*Professor W. G. Farlow.* 50
Japanese Gardening. I.....*Mrs. Schuyler Van Rensselaer.* 51
NEW OR LITTLE KNOWN PLANTS:—Berberis Thunbergii (with illustrations).*C. S. S.* 52
CULTURAL DEPARTMENT:—The Propagation of Rhododendron maximum, *F. L. Temple.* 52
The Fruit Garden.....*Dr. T. H. Hoskins.* 54
Orchid Notes .....*F. Goldring.* 54
Ostrowskia magnifica: Senecio Ghiesbreghtii .....*W. Watson.* 55
Principles of Physiological Botany. V.....*Professor George Lincoln Goodale.* 56
THE FOREST:—The Forests and Woodlands of New Jersey. III...*J. B. Harrison.* 57
ANNUAL MEETING OF THE WESTERN NEW YORK HORTICULTURAL SOCIETY.—The Chautauqua Vineyards.....*A. S. Watson.* 58
Fertilizers.....*Professor Caldwell and Joseph Harris.* 58
Fungus Diseases of Plants.....*Professor A. N. Prentiss.* 59
The Cultivation of the Plum for Market.....*S. D. Willard.* 59
Canning and Evaporating Fruit.....*S. G. Curtice and M. J. Doyle.* 59
New Vegetables.....*E. S. Goff.* 59
NOTES 60
ILLUSTRATIONS:—Berberis Thunbergii, Fig. 90..... 53
Berberis Thunbergii, Fig. 91..... 55

The Nation's Forests.

THE first step in the effort to provide for the conservation of the forests on the national domain should be the withdrawal from sale of all forest-lands belonging to the nation. It will not be necessary to preserve and maintain all these forests permanently, but the extent of forest-territory which will be required by a practical plan of forest-preservation and management for our Western mountain regions cannot be at once precisely determined. A thorough examination of these regions, and of the agricultural country depending upon them for its water supply, will be necessary, in order to show what forests must be retained, and what tracts of timber can be put upon the market without injury to the important interests involved. Until such an examination has been made, none of the forest-lands now belonging to the United States should be sold.

The second step should be to commit to the United States army the care and guardianship of the forests belonging to the nation. There is in time of peace no other work of national defense or protection so important as this which the army can perform, and it is plain that under existing conditions the forests on the national domain will not be—indeed cannot be—adequately guarded and protected by any other means. The measures which have been tried, including those now in operation, or nominally in operation, have proved almost entirely ineffective. The forests on the public lands are pillaged by settlers, and by the employees of railroad and mining companies, without scruple or limit. Other instruments will have to be employed if the forests are to be preserved. Their complete and final destruction, with that of the soil which sustains them, is, under the present system, or want of system, only a question of time, and of a very short time.

The officers of the United States army are educated by the nation for its service, and they constitute a body of men not equaled by any other in our country in their equipment for guarding and protecting the great forest-regions belonging to the nation. They possess every kind of fitness for this work in greater degree than any other class of men, and if authorized by law to undertake this service they would have the power and the means necessary for its performance, while everybody else is at present inevitably powerless and incapable. As there is likely to be very little work for the army hereafter in the care of the Indians, it will be available for this service of guarding the national forests. The work can be done well by the army, and it would cost nothing, or very little, while any other plan would necessarily be both ineffective and costly. This guardianship and defense of the nation's forests by the army of the nation should be continued and maintained until a sufficient number of adequately trained and equipped foresters has been provided by the national government for the administration of a complete and permanent system and policy for the management of the forests on the public domain.

This brings us to consider the third step. This should be the appointment, by the President, of a Commission to make a thorough examination of the condition of the forests belonging to the nation, and of their relation to the agricultural interests of the regions through which the streams flow which have their sources in these forests, and to report, with the facts observed, a comprehensive plan for the preservation and management of the public forests, including a system for the training, by the government, of a sufficient number of foresters for the national forest service.

The Commission should determine what portions of the existing forests on the public domain should be permanently preserved, and in what manner the remainder should be disposed of. The national forests can be so managed that they will be perpetually reproduced, and will yield forever an abundant supply of timber for the inhabitants of the adjacent country, and a revenue which will more than sustain the cost of the forest service. A National School of Forestry should be established at a suitable place in one of the great mountain forests on the public lands, and its equipment should be as thorough and adequate for its purpose as is that of the National Military Academy at West Point.

THE "Elizabethan home" has long been a synonym in American ears for all that is most beautiful in domestic architecture, and, at the same time, most comfortable and home-like. But exact observation and clear judgment have less to do with this feeling than traditional sentiment and the reports of tourists enchanted by the picturesque accessories of English country dwellings. The following description—quoted from the pages of the *American Architect and Building News*, where a recent address by the English architect, Mr. J. A. Gotch, is discussed—gives a more exact idea of Elizabethan architecture than those that are commonly presented to us.

"In planning these homes nearly everything was sacrificed to show. People who lived contentedly with their dogs in rooms carpeted with rushes, which were changed once a week, could hardly be expected to be very squeamish in regard to niceties of arrangement, and it is common to find the bedrooms opening from each other after the fashion of a New York tenement-house, without any corridor for reaching them separately, while in some very magnificent mansions the suites of rooms allotted to visitors could only be reached from the reception-rooms by crossing the court, which, it is needless to say, had no provision for sheltering from the rain or snow the festal clothes of the persons who walked through it. So inconveniently planned, according to our notions, are the Elizabethan mansions in this respect, that they can hardly be used at all by a modern family. One or two of them have been remodeled by the rather heroic treatment of building a corridor around the court-yard, like a cloister, so as to reach the farther bedrooms without going through all the others, but this darkens half the windows, besides spoiling the court. In other cases a portion of the house has been rebuilt, at a great expense, according to our ideas, but most of the Elizabethan palaces, splendid as they once were, have been allowed to go to ruin, simply from the impossibility of utilizing them for a modern family without very costly alterations. Even the reception-rooms, magnificent as they are, accord ill with the

habits of the present representatives of the families which built them. . . . In a few instances, as at Hatfield House, Lord Salisbury's favorite residence, the ancient mansions will probably be kept in habitable condition for many years longer; but the great majority, like Haddon Hall, the most beautiful of all, will inevitably be abandoned, sooner or later, by their owners, from the impossibility of being comfortable in them, and they will fall, one after another, into decay. Whether this will be a great loss to architecture is not altogether certain. The plans have been recorded in many books, so that we shall not lose the recollection of their stately and picturesque arrangement, but the details of the designs are rarely of a very high order of merit. The rich ceilings made of plaster modeled by hand are often the best portions. . . . But the wood-work is no better than that done now, while the carving, both on wood and stone, is of little value, either in design or in execution, and would hardly be noticeable except for the lavishness with which it is used. . . . Moreover, the houses of that period contained glaring faults. Symmetry being, in the minds of the architects of that time, necessary to correct taste, windows and bays were distributed almost without regard to the interior planning, and a bay illumining a great gallery might be balanced by one of equal size in the buttery. Where real windows could not be used, false ones were put in without compunction to preserve the symmetry of the composition, and Cobham Hall, one of the best examples, is . . . 'riddled' with sham windows, put in with real mullions and transoms and glazed, but closed behind the glass with a wall."

These facts are familiar to all who have really studied Elizabethan and Jacobean architecture. Nevertheless, an unreasonable admiration for it still persists in the minds of the public. Knowing that these houses have incomparable dignity and picturesqueness when seen in a general view amid the surroundings with which the passage of centuries has beautified them, even Americans often seem to think that there can be no more certain way of securing a beautiful and comfortable home than by imitating them as closely as possible. We do not say that the actual attempt is very often made, but it is occasionally made in a more or less ambitious and conscientious way; and we could point to one house at least—one of the very costliest country homes ever erected in this country—which has been copied room for room and stone for stone from an Elizabethan prototype. It should be needless to explain, now that our own domestic architecture has developed types of genuine beauty and of complete appropriateness to our own wants, that such efforts must be mistakes both from the æsthetic and from the practical point of view. If the ancient homes of England are proving themselves uncomfortable for habitation even in England, how shall they meet the needs of this country—how shall they suit our habits of life, which differ still more from those of the sixteenth century Englishman than do those of his descendants of to-day? Nor does a really cultivated taste find, as Mr. Gotch confesses, much to admire in the heavy, monotonous, and often clumsy and unrefined decorative motives, which were employed by the architects of the English Renaissance—their work in this direction is, in truth, far inferior, both in design and in execution, to the best that American architects now produce. And, of course, the general and, so to say, superficial charm which old English homes possess in their original situations, is entirely lost when they are transplanted to alien climes and deprived of all historic associations.

Since it was announced that certain improvements would necessitate the destruction of the thirteen trees planted on Washington Heights, in this city, by Alexander Hamilton, to commemorate the original states of the Union, much interest has been felt for their preservation, and a movement has been started to purchase enough land about them for a small park. The trees are Liquidambars, and, although they are called a grove in the newspapers, they really form a dense clump. They all stand within an area fifteen feet square, which means that they were too closely planted to permit of a healthful growth. Several of them are so choked and crowded that at this age their trunks are not more than six or eight inches in diameter, while the trunks of the larger ones are about two feet in diameter. Even the best of them have no symmetrical development, and the tops of most of them show considerable dead-wood. We are not likely to have too many small parks, and it will be fortunate if some of the land about these trees can be devoted to public use. But apart from their historical associations these Liquidambars have no great value. Many single trees are better worth saving, and, indeed, if Alexander Hamilton had planted one tree where he planted the thirteen, it would now cast nearly as large a shadow as they do and it would be much more likely to survive another century.

White Huckleberries.

In Garden and Forest of January 2d there was a notice of the occurrence of a form of *Gaylussacia resinosa* with white fruit in New Jersey. A similar case is known to me at Shelburne, New Hampshire, where a few bushes of *Vaccinium Canadense* bore flesh-colored or pinkish berries, instead of the usual deep-blue fruit. The flesh-colored berries were found at the same spot in two successive seasons, but I have no means of ascertaining whether their occurrence has been noticed for a greater length of time. In the berries both from New Jersey and New Hampshire we have simply albino forms not depending on the growth of a fungus; certainly in the case of the New Hampshire plants, which I examined carefully.

In Germany, however, there has been observed a white-fruited form of the common Blueberry, or *Heidelbeere* of the Germans, which is due to a fungus growth. As long ago as 1859 it was described by Döll under the name of *Vaccinium Myrtillus* var. *leucocarpon*, but, in 1879, Schroeter discovered that the white color was due to the growth of a fungus which he called *Peziza baccarum*, which, in its mature or ascosporic form, consists of a small cup on a slender but comparatively long stalk which springs from a small, hard nodule, the sclerotium. Woronin, in a very interesting paper in the Memoirs of the St. Petersburg Academy, beautifully illustrated, as are all his writings, has recently given a full account of similar white berries found by him in Finland on *Vaccinium Vitis-Idæa*, *V. Oxycoccus* and *V. uliginosum*, three species also found in the United States, and of the fungi which produce the white color.

Woronin considers that the fungi on the different *Vaccinia* above named, although closely related, really belong to four distinct species of *Sclerotinia*. The hard nodules, or sclerotia, are found in the berries late in the season, and the cup-like, mature form is produced early in the spring from the *sclerotia* in the berries which have lain on the ground during the winter. The ripe ascospores in the cups germinate at once, and the germinal tubes make their way into the young stems of the *Vaccinia* in the neighborhood. They penetrate to the woody bundle at first, and afterwards produce a cushion-like mass of filaments under the epidermis, from which grow chains of necklace-like filaments, which cover the surfaces of some of the upper leaves and the young shoots and exhale an odor of almonds. Each joint of the filaments ultimately becomes separated from its neighbors by a peculiar structure, called by Woronin a *disjunctor*, and they fall apart and constitute what are called by botanists the conidial spores. The conidial spores, which mature at the end of May or early in June, are, through the agency mainly of flies and bees, carried to the pistils of the opening flowers. Those which are deposited on the stigmas produce long tubes, which, somewhat like pollen-tubes, traverse the styles, but, unlike pollen-tubes, do not attach themselves to the ovules, but make their way into the placentas. The mycelial tubes then grow and cause an atrophy of the young seeds and internal portions of the berries, although their general size and shape are comparatively unchanged. The tubes finally become indurated and form a compact mass, and the berries blacken and fall.

It is highly probable that we have similar diseases of Huckleberries and Blueberries in this country, and Woronin suggests that it is possible that the disease of the Cranberry, *Vaccinium macrocarpon*, in the United States, may also be due to the growth of some species of *Sclerotinia*, to which genus he refers the fungi described in his memoir. He also mentions similar sclerotioid forms on Cherries, berries of the European Mountain Ash, and a few other plants, and considers that it is probable that the common mould of Plums, *Oidium fructigenum*, is connected with some hitherto unknown sclerotium. *W. G. Farlow.*

Japanese Gardening.—I.

ONE of the best accounts of the aims and results of Japanese landscape gardening that have ever been written in English was published in a periodical which seldom comes beneath the eyes of the general public—the *Transactions of the Asiatic Society of Japan*. Therefore, although it bears date as long ago as November, 1886, a brief summary of it may not be unacceptable. It is itself, however, so condensed, as well as so full of varied and interesting information, that I can do no more than select passages here and there, with the confession that almost all those omitted are of equal value.

"Landscape gardening as practiced in Europe," says the author—Mr. J. Conder, a Fellow of the Royal Institute of British Architects—"is subjected to greater formalities of design than in Japan, and in theory it harmonizes less closely with the features and disposition of real scenery. It is more of a science and less of a fine art." Even in our most naturally designed gardens a certain element of formality is prescribed by the canons of European taste. "Houses being objects exhibiting formal and geometrical lines, it is maintained that such lines should be repeated to a greater or less extent in the adjoining garden, in order to produce an approximate combination." And this feeling expresses itself in details as well as in the general scheme; "trees and shrubs are often selected for their uniformity in size and shape, and grouped in equidistant rows and phalanxes," while it is unnecessary to refer to our use of formal flower beds and minor features. The Japanese have attained to no such skill in the cultivation of exotic plants as has been attained in Europe, "but the absence of such artificial refinements is considerably to the advantage" of landscape gardening as a fine art. "Constructing only with the materials native to the country, the designer is able to follow consistently the arrangements suggested by nature, the landscapes he seeks to reproduce being in all cases identical with the natural types that are familiar to him." As regards scale, the gardens of Japan are far less imposing than those of Europe. "There is little here to compare in gardens to our spacious English parks. . . . The Japanese artist confines himself to narrower and humbler lines, but it must be recognized that within his limits he produces results unrivaled in natural beauty and loveliness. . . . Unnatural regularity is generally most studiously avoided, but the variety obtained is the result of well considered arrangement, and by no means that of hazard."

The theory of the art, like so many other intellectual things, was derived from China, but greater simplicity prevails in Japanese developmnets. "It is usual to divide garden compositions into three styles expressive of their general character, . . . the Finished, or labored style, Intermediate style, and Free, or bold style. In practice these styles are not sharply divided, but a garden, according to its rough or elaborated character, may generally be classed under one of the three heads, . . . and it is an important law that whatever character is decided upon should be consistently followed throughout." The Finished, or elaborate style, is the one least commonly employed. "There are other guiding principles, . . . such as suitability in character to the pursuits and rank of the proprietor . . . and the expression . . . of some predominating sentiment. The garden is regarded as a poem or picture intended to arouse particular associations and inspire some worthy sentiment. . . . If, for instance, a garden be designed for a poet or philosopher, its general disposition should express dignified seclusion, solitude, virtue, or self-abnegation." It is difficult for us, with our less strongly poetic temperament, to sympathize with such aims or even to see how they can be effectually carried out or clearly understood. But to the Japanese the thing seems clear and simple enough, and with the following paragraph even Europeans should be in heartiest accord: Gardens, it is said, should be undertaken from a genuine love of nature "and with a desire of enjoying the beauties of natural scenery, and should be so arranged that the four seasons may each contribute in turn to their artistic excellence. They should be pleasant retreats for hours of leisure and idleness; and as one writer has poetically expressed it, 'places to stroll in when aroused from sleep.' . . . In western designs the idea of displaying wealth and luxury is paramount, and our gardens are principally regarded as resorts for the pleasures of society and fashion; whereas in Japanese gardens the prevailing intention is rather that of a place exempt from public haunts and fitted for unrestrained ease and meditation." Such ideas as The Happiness of Retirement, Modesty, Peace, Gentleness and Chastity, Connubial Felicity and Old Age, the Japanese strive to express in their arrangements. In part their success depends upon the emotions naturally excited by scenery of various kinds, but in part upon traditional historical or philosophical meanings which are associated with many of the arrangements adopted, and, of course, cannot be understood by foreigners.

Passing from theory to practice, Mr. Conder notes that the first step in the artist's education is to visit good scenery and make notes and sketches. These, of course, "cannot be closely followed in preparing designs, but will supply suggestions and lead to originality in composition. . . . Before proceeding to execute a landscape-garden a careful survey of the site and its surroundings is necessary. If it be a bare and level area, the designer is free to arrange his composition in any way that he may please according to its size, bearing in mind the locality and surroundings, and the character of garden suited to the particular proprietor. But if it be a site possessing natural facilities, such as fine trees in prominent positions, hillocks, a stream, or even a natural cascade, the artist will consider how such natural features can be utilized and worked into his design. . . . A neighboring view may be cleverly taken advantage of, and the garden so arranged as to harmonize with it, the distant landscape when seen from the rooms of the house actually appearing to form part of the whole composition. Aspect must be considered as well as prospect. . . . Great care is recommended in considering the scale of a garden. 'If a small garden be arranged on the same plan as one of a larger model, it will look weak and unsatisfactory; and . . . if a large garden be designed upon the lines of a smaller model, it will lose all its grandeur. . . . For example, the arrangement of two or three large rocks in front of a clump of fine trees in a large garden will look more imposing than a greater number of smaller ones. Multiplicity of detail within small compass is, however, necessary in a little garden, in order to give it interest and add to its apparent scale. . . . A garden is, above all, a place for summer enjoyment, . . . and must therefore, by all means, look cool and refreshing; but such coolness is not produced by planting trees too densely and crowding the area with many objects. A few masses of foliage, judiciously arranged in the background, may be made to impart a fresh and cool effect. The presence or suggestion of water is necessary; but it must be remembered that clean, shallow and running water looks much cooler than deep, stagnant or weed-covered pools. The total absence of litter and untidiness, added to the presence of water, produces the most refreshing effect. A garden, therefore, should have large, open spaces, cleanly kept, with stretches of white sand or gravel in the foreground and moss in the background. . . . In large compositions the distribution of areas and contours demands the first attention. In some cases advantage will be taken of natural elevations and depressions in the ground. Sometimes a site may possess a stream, cascade or natural inlet of water. Supposing no such facilities exist, the aspect and prospect which the plot possesses will be carefully studied, and the best positions for hill and dale, lake and waterfall, determined. It often happens that water cannot be obtained; and if the character of the scene to be represented requires it, it is not unusual to arrange the hills, rocks and plants in such a way that the idea of water may be suggested. Sometimes a stretch of bare, beaten, brown earth or of well-raked sand will indicate a lake or sea, and a meandering, pebbly bed a river, the surrounding rocks, plants and piles further assisting the delusion." No rules strictly direct such arrangements, yet several general guiding principles are respected, for a Japanese garden is "more than an artistic disposition of trees, flowers, shrubs and stones. It is a real picture composition, intended to represent some imaginary landscape. . . . The principle of suggesting to the imagination the idea of space by means of blanks and obliterations, so common in Japanese pictorial art, is followed also in horticultural compositions. A hill, it is said, should never be constructed touching an outer fence or boundary; a space behind it, however small, produces an

idea of greater extension of the garden. By a similar theory the spaces immediately behind the nearer hills should be left open and not filled with detail. There are five principal hills specified for gardens. . . . in the Finished style. Hill No. 1 forms the most central feature of the nearer distance. . . . As it represents a near mountain of considerable size, it should have broad and sweeping sides, and may have a pathway and a little house or pavilion upon it. Hill No. 2 should be placed adjacently to No. 1, a cascade and rocks often dividing the space between the two. It is secondary to No. 1, and should be somewhat smaller and of different character. Hill No. 3 is placed upon the other side of No. 1 near the base of its broad slope and more in the foreground; it suggests the idea of a lower hill divided from the main mountain by a depression. This depression may be supposed to be occupied by a hamlet, road or stream, in which case its sides should be clothed with a few thick-foliaged trees or shrubs to add to the impression of a sheltered and inhabited dale. No. 4 is a small hill generally introduced into the near foreground; it should have none of the characteristics of a large mountain, should be low, rounded and covered with much detail in the form of stones, shrubs and flowers. Hill No. 5 is in the remotest part of the garden, and, as it represents a distant mountain, it should be steep and mysterious without much detail."

This, then, in general terms, is the scheme upon which a Japanese constructs one type of garden, varying it, of course, in multitudinous ways to suit the suggestions of the site or the leanings of his individual taste. It may seem at first thought as though, while avoiding artificiality in one direction, the artist who works thus falls into it in another direction — our idea of a "natural" landscape arrangement is certainly not the wholesale creation of features which sometimes are not even suggested by the site, nor the simulating in miniature of large natural forms, nor the effort to make sand or gravel do duty for water or small shrubs produce the effect of trees. Could anything, we ask ourselves, be more unnatural than a small garden designed to imitate an expanse of mountain scenery, with bare earth instead of living water for its lakes and streams?

But it seems to me, after much reading upon the subject, that the Japanese aim is not more wholly different from ours than is the spirit in which this people looks at works of gardening art. It is often said that they have less imagination than Occidentals; but the statement refers merely to abstract imagination, so to say—to metaphysical, spiritual imagination. As regards material imagination—the picture-making power of the eye, the ability to recognize, appreciate and enjoy the beauty and sentiment of a thing which is not actually imitated or even portrayed in art, but merely suggested—the case is exactly the reverse. Here the Oriental imagination is much stronger than our own. Whether we try, in our garden arrangements, to be formal and architectural, or natural and free, we demand that the desired effect shall be actually, practically, materially obtained, that the things we see shall be literally themselves, and depend not at all for their significance upon the imaginative faculties of the observer. The Japanese, on the other hand, never desires anything but a strictly natural effect; but he is content that it shall be suggested rather than displayed. The elements before him are valued less for themselves than for their power to act upon his imagination and recall the forms of beauty which they typify rather than reproduce. We demand in a natural garden that it shall be a beautiful passage of scenery. The Japanese demands that it shall suggest a beautiful passage of scenery. His garden is to him less a landscape, properly so called, than a picture of a landscape; and he does not see anything more unnatural in a small picture composed of piles of earth, rocks and shrubs representing mountains, trees and lakes, than we see in a small painting on canvas when it represents similar objects. We know that an adequate statue of a man can be made within the compass of a few inches, and never think of questioning its truth or "naturalness" because of its size. It does not purport to be the man, but merely suggests the man, and our imagination accepts it without thought of its discrepancies in size and color. Thus the Japanese looks upon his little studies of mountain scenery, and finds them as thoroughly natural as works of art can be.

How soon an Occidental can learn to assume his standpoint, how thoroughly he can learn to appreciate the suggestive beauty of Japanese gardens—these are questions, of course, with regard to which only travelers can speak, and Mr. Conder does not touch upon them.

New York. *M. G. van Rensselaer.*

New or Little Known Plants.

Berberis Thunbergii.

ALTHOUGH one of the earliest Japanese plants known to botanists, having been collected by Thunberg, one of the first Europeans to explore the botany of Japan, *Berberis Thunbergii* has found its way into western gardens only within the last few years. Thunberg considered it identical with *B. Cretica* of south-eastern Europe, which, perhaps, is nothing more than a geographical form of the widely distributed and very variable *B. vulgaris;* while some later botanists have referred it to *B. Chinensis* of northern China, a very different plant, with slender pendulous branches, and long, drooping racemes of flowers and fruits. *Berberis Thunbergii* is, nevertheless, one of the best marked and most distinct of all the Barberries now found in gardens. It forms in cultivation a dense, although graceful, bush, some three feet high by four or five feet in diameter. The branches are stout, pendulous towards the extremities, deeply grooved, covered with bright red bark, and armed with simple, straight spines, half an inch long. The leaves are deciduous, tufted along the entire length of the branches, obovate or spathulate, rounded at the apex, quite entire, bright green above, paler on the lower surface. The flowers, which are produced in the greatest profusion along the whole length of the stems, are solitary or in pairs, or rarely in few-flowered umbels. They are rather large, with three or four acute red sepals and pale straw colored petals, sometimes streaked with red, and are almost odorless. The fruit is bright red, a quarter to half an inch long, elliptical, or nearly globose. It possesses an insipid and very disagreeable flavor, and remains upon the branches bright and fresh through the winter, and until the appearance of the new foliage in the spring. The leaves of this plant late in the autumn are tinged with brilliant shades of orange and scarlet.

Berberis Thunbergii was sent several years ago to the Arnold Arboretum from St. Petersburg, and is now often seen in American gardens. It has much to recommend it—hardiness, free and rapid growth, neat and graceful habit and foliage, brilliant autumn coloring, and showy and persistent fruit; and few shrubs are better suited to form low masses of foliage, or for dwarf hedges. It is not particular as to soil, and, like the other Barberries, is easily increased by division, from cuttings and from seed.

Our illustration upon page 55 represents a well grown specimen of *Berberis Thunbergii* in a garden near Boston, and shows the habit of the plant; while Mr. Faxon's drawing upon page 53 makes known to persons unfamiliar with them the foliage, flowers and fruit of this species, of which an excellent colored figure was published in the *Botanical Magazine* for 1882, *t.* 6,646. *C. S. S.*

Cultural Department.

The Propagation of Rhododendron maximum.

Sir.—In 1885 a distinguished landscape-gardener remarked that whoever would produce *Rhododendron maximum* so cheaply that it could be freely used, would render a service to all planters, and this suggested some extended experiments at the Shady Hill Nurseries.

First, fresh seed of this Rhododendron were planted in boxes of carefully prepared soil in February. They came up promptly and abundantly, but difficulties began at once. This plant, when first germinated, and for some time afterwards, is the most delicate little atom of vegetable life that can be conceived of. It is exceedingly small, and is as transparent as water, of which, with a very thin film of more solid substance to inclose it, it seems largely composed. This delicacy of structure exposes it to the attacks of a minute fungus, which often kills a box of several thousand little seedlings in a single day. To save them from this devouring enemy, which always appears as soon as the plants do, it is necessary to transplant them into fresh earth immediately after the seeds germinate. This was done three times, and then the plants became a total loss from the persistent attacks of this fungus. We

transplanted many thousands, and finally, after the most patient and painstaking efforts, continued through two winters, saw all our labor end in failure.

The prime conditions necessary for the healthy growth of the seedlings of this species are, evidently, absolutely perfect drainage, plenty of fresh air, and a rather deep shade. The green-house did not supply these conditions. Then a bright thought occurred to one of the men watching the experiments, by which we hoped to supply the exact conditions of nature and let nature take all the care of the plants.

In April, 1887, we planted plenty of seed of this plant on the surface of old, mossy logs, which lay half submerged in the water of a springy bog, at the foot of a mountain. These logs soaked up water from below, and were never dry, even in summer. They were also in a rather deep shade, as tall trees stood about them on all sides. I had often noticed small plants of different *Ericaceæ* in abundance on top of much decayed stumps in such places, so that I planted the seed with some hope.

In November, 1887, the logs were covered with multitudes of little plants of our Rhododendron, but pitiful looking things they were. In size from one-sixteenth to one-eighth of an inch high, and still so watery and transparent that we had no expectation of their ability to survive the winter.

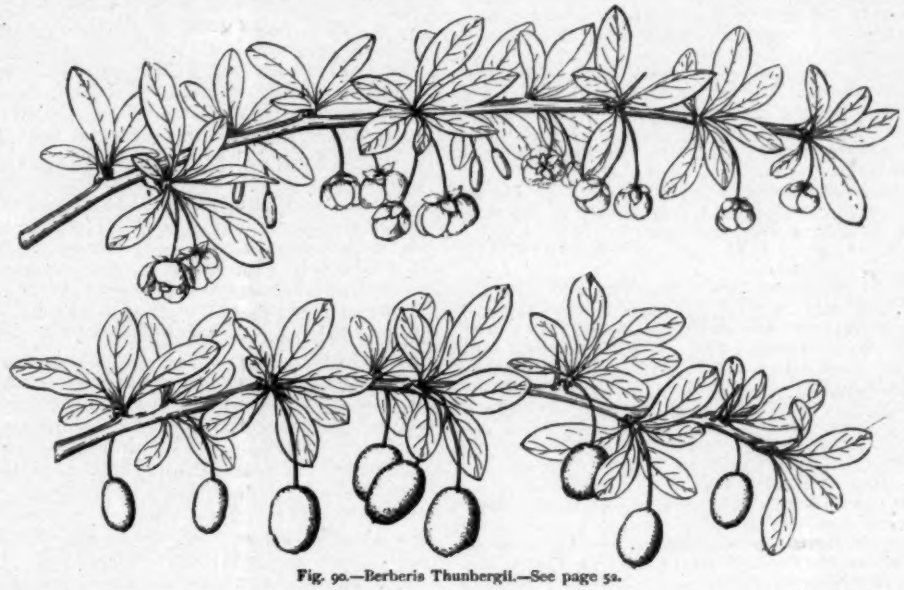

Fig. 90.—Berberis Thunbergii.—See page 52.

In November last the seedlings were, to our surprise, half an inch high, with leathery leaves, and were safe and solid, and from that time on we knew it was plain sailing. This is a slow but a sure and an easy way to make this magnificent native Rhododendron as cheap as any ordinary shrub, and I hope it will be put in use by many nurserymen.

Somerville, Mass. *F. L. Temple.*

[It is true that success in growing Rhododendrons from seed is almost impossible when they are started in a house devoted to a mixed collection of plants which require treatment entirely different from that needed by the delicate seedlings of the different species of Rhododendron. The device of our correspondent bridges over the most dangerous period in the growth of the seedlings, and when time is no object and where one has a swamp filled with moss-covered and decayed logs no doubt large numbers can be produced in this manner. But nurserymen are not always the fortunate possessors of swamp-land, and besides this, they are obliged to raise stock more quickly than is possible by the swamp-method. Although the seeds of Rhododendrons are very minute, and the plants in the first six months of their existence require the most delicate handling, yet if a house is devoted exclusively to their propagation, so that they can be watched and watered, shaded and transplanted at precisely the proper time, they can be grown rapidly and successfully. Four years ago Mr. Jackson Dawson, in an address before the Massachusetts Horticultural Society, explained in detail the method he has practiced with uniform success. The seed is sown in earthen pans early in January, in a soil of peat, loam and sand in equal parts. The sand should be sharp, but fine and clean, and entirely without iron or clay. Over the broken crocks, which should fill one-third of the pan, a covering of sphagnum or coarse siftings of peat is placed, and upon this two inches of the prepared soil is sifted, and then well firmed and watered gently. As soon as the soil is settled the seed can be sown quite thickly. It should then be covered with the slightest possible sprinkling of soil, after which a covering of fine sphagnum is put over it, a gentle syringing is given, and the pans are placed in a temperature of seventy degrees. After sowing, the seed should on no account be allowed to get dry; but at the same time saturation should be avoided. It will usually come up in from two to three weeks, and as soon as the first seedlings are seen the coarsest of the moss should be gradually removed, and when the seed is fairly up a slight sifting of fresh soil among the young plants will help to strengthen them. As soon as they have made the first rough leaf, they should be pricked off thickly in boxes or pans of fresh soil prepared as for the seed, carefully syringed, and kept growing in a high temperature and moist atmosphere. Such delicate seedlings as Rhododendrons at this stage should never be transplanted in a shed or room where there is any draught, but always in a close, moist atmosphere, as the roots are so delicate that only a moment's drying makes them almost worthless. After five or six weeks the plants will have covered the surface of the ground, when they will again need transplanting, this time half an inch apart, and otherwise should be treated as before, always having fresh soil and clean boxes at each transplanting. At this stage, if everything has been carefully attended to, they will grow very rapidly, and will soon need transplanting the third time, and, if properly cared for, may be set two inches or more apart.

This frequent transplanting in fresh soil each time keeps the plants from damping and lays the foundation for a vigorous plant for the future. If Rhododendron seedlings are left long in the seed-box or pan, they are apt to be attacked by a minute fungus, which will often carry off

thousands in a night. The best remedy, at the first signs of its appearance, is to sift heated sand amongst the young seedlings, using a very fine sieve. This looks like heroic treatment for plants of this tender age, but it is very effective in destroying the fungus, and does not injure the young plants. About the first of September more air and less moisture may be given, so as to harden the plants preparatory to their removal to winter quarters, which should be a deep frame or pit in some sheltered situation. They may be put in this pit the first of October; or sooner, if the house is needed for other purposes. In this pit they should have plenty of air every pleasant day, but should be covered every night to keep them from frost as long as possible. This can readily be done in most seasons up to the middle of December or the first of January by a single mat; they can then be covered with mats or meadow hay, and will need to be uncovered only once in every two weeks for an hour or so to guard against damp or excessive moisture, which often will induce a growth of fungus even in a cold pit if it is kept long without airing. In the spring, about the first of May, the young plants can be transplanted into well-prepared beds of peaty soil, or a light, sandy loam of good depth. If dry weather sets in, they will require plenty of water, as they are not deep-rooted at this time; if water is handy, a good syringing may be given every evening as soon as the sun begins to leave the bed, until the middle of August, when all moisture should be withheld, so that the plants may ripen well before winter sets in. If they have been well cared for, they will be from six to seven inches high at the end of the second season.

At the approach of cold weather a slight covering of leaves between the young plants with Pine boughs or coarse meadow hay, over the tops, to keep the sun off, will carry the plants through the winter in safety. The following spring they may be planted in the nursery, where they can remain until used. The same treatment will apply to Azaleas, Kalmias, and other Ericaceous plants, only the Azaleas grow much more rapidly than the others, and at the end of the second season such species as *A. mollis* and *A. calendulacea* should have quite a number of flower-buds on them, while the Rhododendrons will not show signs of flowering until the fourth or fifth year.—ED.]

The Fruit Garden.

MULCHING STRAWBERRIES IN WINTER.—Much has been written about this, and no one doubts the benefit of it. In northern Vermont, however, we can pretty safely depend upon a snow mulch from December 1st to April. This winter is an exception. We have had no snow yet, to amount to anything, and in the middle of January our roads are bare, and as smooth as the best Macadam. The fields have but a sprinkling of snow, and the strong Strawberry plants stick up through it; but though somewhat seared, they seem yet little the worse for the exposure. As regards material, the ideal mulch for almost everything is evergreen boughs; but it is not often practicable to get enough of them. Oat, wheat and rye straw are used, and the last is best of the three; but better still is bean straw. If evenly applied, it is not beaten down by the snow so as to smother or rot the plants, and it holds even the lightest snow in its open meshes, thus utilizing to the utmost all that comes.

PROTECTION OF TREES FROM MICE.—Binding the trunks with tarred paper is what is commonly advised for this purpose; but the paper is apt not to give complete protection near the ground. It also costs more and does not last so long as the laths and barrel staves that I have used for many years. These are cut in two in the middle, driven or pressed slightly into the soil, and tied with a single turn of strong cotton twine. They may be left on the year around, and in the fall are utilized by the codlin worms as an apparently safe retreat. But late in the fall they are tied again, being reversed, so that the spun-up worms are left exposed to a cold world, and are cleaned off very quickly by the birds. Quarter-inch board is preferable to barrel staves, on account of the bilge-curve of the latter, which does not allow them to be turned; but if the strings are cut a few days in advance, and the staves laid on the ground so that the inner sides are exposed, the birds will clean off the worms in a short time.

WHEN TO PRUNE.—It has a smart, snappy sound to say "prune when your knife is sharp," and for such pruning as may be easily done with a knife, it is well enough. But for the larger limbs that must often be amputated, pruning when your saw is sharp will not answer always and everywhere. Where all trees are so hardy that a cut, however large, never blackens or "bleeds," one may prune at any time with safety, while trees are not in leaf. But in the northern tier of states there are many trees planted that are more or less injured in their wood by hard winters. Such trees are best pruned after the severe weather is over, but then as early as possible, so that the wound will get pretty dry before the sap starts. This will not always prevent "bleeding" when a tree has been much hurt by low temperature, but it is the best that can be done for them.

WHAT TO APPLY TO THE CUTS.—I have tried grafting-wax, both solid and liquid, and various cements. Wax cleaves or crumbles off too soon. The best cement I have used is made by boiling pine-tar slowly for three or four hours, adding half a pound of beeswax to a quart of the tar. Have ready some dry and finely-sifted clay, and when the mixture of tar and wax is partially cold, stir into the above named quantity about twelve ounces of the clay, continuing the stirring until the mixture is so stiff, and so nearly cool, that the clay will not settle. This is soft enough in mild weather to be easily applied with a knife or spatula. But of late I have found that any thick ochreous paint, put on with a brush, answers every purpose, and can be applied faster and more easily than anything else. On large wounds it may need renewing, and if a red paint is used they are more easily seen.

CUTTING AND KEEPING CIONS.—I have always been best satisfied with the growth of cions cut in the fall. This, I know, is not so necessary in milder localities, but I believe it is best everywhere. It is often said that cions should be cut from bearing trees; and many believe that this favors early fruiting of the graft. I wish I could see some proof of so easy a method of bringing late-bearers forward. I think, if one is sure of the variety, there is no good reason why the cions may not be taken from the youngest trees—even from the nursery. To keep them well over winter, it is usually advised to pack them in damp moss or sand. It is difficult to get moss just right in dampness, and sand endangers the sharpness of the knife in grafting. The very best packing material is green-wood sawdust, just as it comes from the log. Cions nicely tied in bundles and labeled securely, and so packed, firmly compressing the sawdust under, over, around and between the bundles, well covered and kept cool, will come out in the spring in perfect condition.

Newport, Vt. *T. H. Hoskins.*

Orchid Notes.

The most conspicuous objects in the cool house at present are specimens of *Ada aurantiaca*, the showiest of all cool Orchids, excepting *Epidendrum vitellinum*. It grows in masses, with tapering bulbs and narrow, deeply channeled, dark green leaves about one foot high. The distichous racemes spring from the base of the bulbs, bearing about a score of reddish orange flowers, in which the segments are compressed near the base and spreading at the apex. The whole flower is from one to two inches long, according to the variety. This is a strong grower and may always be depended upon to give a good crop of bloom. It requires an open soil with good drainage, and should have a plentiful supply of water at all seasons. Near the Ada and helping to relieve its brilliant hues, are plants of the Lily-of-the-Valley Orchid (*Odontoglossum bulchellum*). This is a most attractive species, growing in dense masses, with ancipitous, shiny bulbs and long, grassy leaves. The half pendulous racemes bear about a dozen flowers, which are pure white, excepting the prominent golden crest. They last a long time in perfection, and their usefulness as cut flowers is greatly enhanced by a delightful Hyacinth fragrance. Some three or four varieties of this species are known, the best being probably a very large form called Dormannianum. *Maxillaria picta* should be grown, if only for its powerful aromatic fragrance. This is a dwarf kind, with tapering, yellowish and furrowed bulbs and short, leathery leaves. The single-flowered scapes spring in abundance from the base of the bulbs—more than a score from one bulb. The flowers are cream colored, dotted with purple and chocolate. It does well in a cool house, with a good rest, after growth is finished.

Odontoglossum triumphans is a showy Orchid introduced nearly fifty years ago from New Granada, where it is met with in dense forests, in company with *O. Pescatorei*, but it is not at all plentiful. The bulbs are ovoid, compressed, and attain a good

size; the deep green leaves are about one foot long. The arching racemes bear from twelve to twenty flowers of good substance, and about three inches across, golden yellow, heavily blotched and barred with cinnamon brown and margined with pale yellow. The lip and column are pure white, with one large irregular blotch of yellowish brown on the anterior lobe. This is a handsome Orchid and a few plants will be found very useful to brighten the more sober tints of the varieties of *O. crispum*. It is robust and free growing, requiring an open soil with good drainage and a liberal supply of water at all seasons.

Lycaste lanipes.—Though not a showy Orchid this will be found very useful for cutting, as it produces abundant flowers from the base of the matured bulbs, and lasts a long time in perfection. In habit it resembles the well-known *L. Skinneri;* but the bulbs are larger and the leaves are of leathery texture. The creamy white flowers are four to five inches across, with a pure white lip beautifully fringed along its margin. It should be grown in a rich, open soil, in an intermediate temperature, kept moderately dry after the bulbs are matured. It is a native of Guayaquil.

Angræcum sesquipedale.—This is an interesting and very striking Orchid introduced some sixty years ago from Madagascar, where it luxuriates on large trees with a maximum of heat and moisture at all seasons. It is a large plant, with broad, distichous, dark green leaves, very stiff and leathery. The large, star-like flowers are borne on axillary racemes, usually three in number, about eight inches across, very fleshy and ivory white. The cuspidate lip terminates in a spur or tail sometimes eighteen inches long. The flowers last about three weeks if kept somewhat cool and dry. This Orchid does well in a pot filled with large lumps of charcoal and a plentiful supply of sphagnum. It should be in the warmest house, and abundantly supplied with water during the growing season, and at no time allowed to become dry, or the loss of the bottom leaves will result. A fine variety of this called Majus comes into flower somewhat later, is more robust in growth, and the flowers measure fully eleven inches across.

Another fine Orchid flowering at this season is *A. eburneum*, which comes from the same locality as the plant last mentioned. This is a very strong and free growing species, of noble appearance, with thick, fleshy stems, bearing broad, distichous leaves about two feet long, from the axils of which spring stout racemes two feet long, bearing a dozen large, greenish white flowers with a cordate, cuspidate lip of ivory white, and lasting about six weeks. This grand Orchid will repay liberal cultivation, as it delights in a rich soil kept open with nodules of charcoal. The roots quickly fill the pot, when the plant will be benefited with weak liquid manure. The best plants I have yet seen are growing among a collection of Palms and foliage plants and receiving the same treatment. The best form is Superba, a great improvement on the type, but unfortunately it is somewhat rare. A small growing and free flowering variety is named Virens. This is a very inferior form, but is often grown for its floriferous qualities.

Among the many choice varieties of *Lælia anceps*, Hilli and Veitchi may be noted as of especial merit. The former has large flowers of good substance, pure white tinged with pale purple. The side and front lobes of the lip are broadly margined with amethyst purple, while the crest is a pale yellow. In Veitchi the segments of the flowers are narrow and smaller, pure white, with side and anterior lobes of the lip finely streaked and spotted with pale rose purple.

F. Goldring.

Kenwood, N. Y.

Fig. 91.—Berberis Thunbergii.—See page 52.

Ostrowskia magnifica.—*The Garden* contains a capital figure of this handsome new Campanulaceous plant. Herr Max Leichtlin, to whom horticulturists are indebted for the possession of living plants of it, has already stated that it is easy to grow, is as hardy as a weed, and thrives in any soil. It has erect stems about a yard high, with toothed, oblong leaves in whorls and a terminal head of flowers, each on a long stalk, semi-nodding, bell-shaped, four inches across, two inches deep, the corolla lobed and spreading, the stamens and stigma as in Platycodon. The color is purplish-lilac, with darker veins. It was discovered by Dr. Albert Regel in eastern Bokhara in 1884, and flowered for the first time in cultivation with Max Leichtlin in 1877.

Senecio Ghiesbreghtii.—In addition to its usefulness as a large, winter flowering shrub for the conservatory, this handsome Rag-wort may be grown in eight-inch pots, when its

stem attains a height of about two feet, with large, handsome foliage, and enormous heads of yellow flowers, which last a month or more. The plant is as easy to grow as *Paulownia imperialis*, but it is not quite as hardy.

Kew. *W. Watson.*

A hardy shrub with beautiful foliage just now is the *Andromeda Catesbæi*. Its stems are deep green, its leaves a dark bronze, while its racemes of flower-buds, which are already a half inch in length, in preparation for spring, are of a rosy red color. *Joseph Meehan*

Germantown.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

V.—SOME OF THE EFFECTS OF EVAPORATION FROM THE LEAVES ON (1) THE PLANT, (2) THE SOIL, (3) THE ATMOSPHERE.

EFFECTS OF EVAPORATION FROM THE LEAVES ON THE PLANT ITSELF.—The amount of water which the plant loses by means of the leaves is, as we have seen, relatively large. Since, of course, it is only the water which escapes, the mineral matters which the root-hairs brought in with the water must remain behind. Therefore, the primary effect of the evaporation from the leaves is concentration of dilute solutions. The amount of mineral matter existing in leaves in autumn is appreciably greater than in the early summer before the work of concentration has proceeded far. The simplest experiment to prove this is the combustion of a leaf plucked from the tree in late spring or in early summer, and one taken from the tree just before the close of the season. The latter leaves a larger amount of ash, or incombustible matter, behind, than the former. Concentration by evaporation is an important factor in nutrition, as we shall see in a later paper.

EFFECTS OF EVAPORATION ON THE SOIL.—The only question to be considered with respect to this is, can the amount of evaporation sensibly affect the amount of water in a saturated soil? In other words, would it be possible to employ any plants for drainage purposes? The answer to this is not yet quite clear, for the experiments upon the subject have not been long enough continued, and in many instances they lack scientific accuracy, not so much in the manner in which the details have been stated, as in the disregard of disturbing conditions. The most interesting instances are those of the planting of Blue Gum, a species of Eucalyptus. This tree has long possessed a certain reputation for its supposed power to destroy, or at least to mitigate, the effects of miasm originating in marshes. It should be stated at the outset that the leaves yield a product known as eucalyptol, having more or less decided antiseptic qualities. As the distinctive odor of this substance is given off by crushing or by bending the leaf, or even by rapidly moving the leaf, especially on exposure to the sun's rays, it has been believed by some writers that the effects in reducing the deleterious influence of marsh-miasm may be wholly attributed to the eucalyptol-like volatile matter. But the plant has remarkable powers of giving off water in the state of vapor. The amount has been variously stated by different authors, but a fair average of the results of experiments on *Eucalyptus globulus* would make it not far from two quarts of water daily for every square yard of leaves. This amount, though large, would be considered by some engineers as too small to be a very efficient agent in the drainage of swampy ground, but, as may be seen by the accounts of success in the Roman Campagna,* especially at the "Three Fountains," there are plainly two sides to this question. A quotation from a work not readily accessible to the readers of this journal will indicate that in the country of which the species of Eucalyptus are natives, remarkable effects are attributed to the odorous emanations from them.

"That these enormous giants exercise an influence on the climate of the district cannot be doubted, the whole atmosphere being impregnated with a pleasant aromatic odour issuing from them. The odour is especially noticeable in the early morning, and it produces an agreeable feeling of invigoration, accompanied with a desire for exercise. The inhabitants of the locality all enjoy excellent health, and strict inquiries revealed the fact that no severe illness had occurred in the Karri District within the memory of the oldest inhabitant, while invalid visitors almost invariably improved in health."—Rattray and Mill's "Forestry and Forest-Products." 1885. From E. J. C. Brace's Prize Essay on Eucalyptus Plantations, p. 237.

Other plants, notably the common Sunflower, have been mentioned in connection with this matter of draining swampy land, and good effects have been obtained where the task imposed upon the plants has not been wholly out of proportion to the extent of foliage. In a detailed consideration of this question, which the present paper cannot attempt, attention should be directed (1) to the mechanical effect produced by the larger roots, serving, as they do, about the same office as the branches and twigs in an ordinary "brush drain," and (2) to the action of leafy branches in intercepting currents of air, both of which have a bearing on the hygienic improvement of wet land.

* *Chambers' Journal*, 108, 193.

EFFECTS ON THE AIR OF EVAPORATION FROM THE LEAVES.—Every one knows that the atmosphere possesses the power, varying with the temperature, of taking up water and retaining it in the form of vapor The total amount at any time is its absolute humidity.

When at any given time the atmosphere has taken up all the moisture that can be retained at that temperature, it is said to be saturated. Any proportional part of this amount expressed in percentage is its relative humidity.

Observers have shown that the absolute humidity of the atmosphere in a forest is hardly greater than that of the air over open ground. But, on the other hand, the relative humidity is not far from six per cent. higher in the former than in the latter case. Can a forest, by this slight difference in the amount of moisture which its atmosphere contains, or by the innumerable points of contact presented by the leaves, or by the cooling effect of evaporation from the leaves, affect the precipitation of rain at any time? Or, to make the question more general, do forests affect rainfall? This question, like almost any about which not enough is known, has provoked discussions which have been unnecessarily acrimonious. Even the highest authorities are very far from agreement in this matter. Ebermeyer, a distinguished and critical student of the subject, wrote thus in 1873:

"Forests increase the annual relative moisture of the air, but this "influence is much more noticeable at high elevations than at low "elevations. The precipitation of moisture (dew, cloud, rain, snow) "takes place more readily on this account in wooded than in treeless "regions, and the frequency and intensity of these precipitations in-"crease with elevations above the surface of the sea. Moisture "descends more readily and freely upon a wooded than upon a tree-"less mountain of the same height. Forests affect rainfall only so far "as they increase the relative amount of water held in the air, and "thus bring the relative amount nearer the point of saturation; thus, "with fall of temperature in the forest, a part of the moisture is easily "precipitated. . . Forests make the climate of a country moister, "and especially so in the summer."

Some later investigations in Bohemia, in European and Asiatic Russia, and in India, point in the same direction, but in our own country numerous comparisons may be fairly interpreted in exactly the other way. The question waits for further facts.

THE PRESSURE EXERTED BY SAP.—When a branch is cut in one of the early days of spring there is generally a flow of liquid from the cut surface which varies in amount during different periods of the twenty-four hours. An experimenter in the last century showed that this flow from the cut surface is not passive, but that the liquid is forced out, and he proved by a pressure gauge that the amount of pressure was very great. Similar experiments have been repeated both in Europe and in this country with substantially the same results. Some of the more interesting here were undertaken at the Massachusetts Agricultural College, in 1873, and showed that the pressure might amount to even three atmospheres. The food stored in the tissues of most of our forest trees during the summer is in the form of starch; this is converted, toward the end of winter, into some sort of sugar, thus passing into solution. This complex solution, together with the crude liquids brought in through the roots from the soil, constitutes the sap as it flows from a wound. The factors determining the pressure are (1) the osmotic force previously described and (2) the expansion of the air in the air-spaces of the woody tissues. At nightfall, or with a reduction of temperature, the pressure ceases or becomes negative—that is, there is an actual suction into the plant.

There are one or two phenomena observed in the flow of sap, which are as yet unexplained.

WATER-PORES.—On the tips of the young leaves of some plants, in warm mornings, drops of water can be seen, which seem at first like drops of dew, but immediately on their removal other drops take their place. In some cases, particularly in plants of the Calla Lily family, these drops follow one another rapidly, and the water may even escape in the form of a fine jet. The pores through which this water is forced are somewhat like stomata, or breathing-pores, but they are not in any sense true valves.

Cambridge, Mass. *George Lincoln Goodale.*

The Forest.

The Forests and Woodlands of New Jersey.—III.

TREATMENT OF HILL-SLOPES.—Some broad, beautiful slopes and hill-sides on the New Jersey side of the Delaware River have been irretrievably ruined by most unintelligent management. They were originally covered with a heavy growth of trees, and were thus protected from destructive washing and land-slides. There was an obvious and imperative necessity that such land should be left permanently under forest conditions. This could easily have been done without restricting in the slightest degree its productiveness. All the timber that it would yield could have been cut off when the crop would best meet the demands of the market, without any interference with the conditions required for the perpetual reproduction of the forest. It was only necessary to protect these steep tracts from fire and from pasturage. The ruin of such slopes is caused more frequently by pasturing them than in any other way. The woods are thus finally killed out, and then the soil begins to wash away where the strongest currents of water descend. Small gullies are found at first; and as the strong, elastic network of living roots decays, huge slices of the surface of the hill-side begin to slip down, and there is soon an unsightly mound at the foot of the slope, where the soil of broad and fertile acres has been deposited, or it has all gone into the river below.

Some such declivities are destroyed by the attempt to cultivate them, but this is idiotic and suicidal. When land is so steep that it must inevitably wash away and be destroyed whenever the forest is removed, the collective intelligence of the community should interfere if the individual owner is incapable of taking care of his own possessions. In many instances the injury to such hill-slopes, once started, extends to other farms, and destroys lands that were in their own conditions protected and safe.

Because such destruction of fertile and valuable land goes on in detail, a little here and a little there, nobody thinks about it. But along every considerable river flowing through a hill-country the permanent damage and loss of value amounts to hundreds of thousands of dollars. If the land thus destroyed along the whole length of the stream were carried out from one place it would make a great sensation. People would think about it, and something might be done to prevent it. In every region of steep, rolling land or hill-slopes, where the soil has any considerable fertility, the same process of destruction is constantly going on, and the owners of the land accept such ruin as if it were wrought by the direct act of God, or the resistless processes of nature, whereas it is caused solely by their own lack of intelligence. It is entirely unnecessary, and a very slight exercise of thought and judgment would suffice to prevent it.

PROFITS FROM WOODLAND.—The profit from woodland is varied greatly by different conditions, such as distance from market, facility of transportation, the relation of supply to demand, and other causes. In some parts of the state, as in Salem County, many owners think their woodlands yield no profit whatever. Some of them say that they keep their lands in forest only because the wood would not pay the cost of cutting it off. Others say there is no profit or benefit beyond the mere convenience of being able to go out and cut a sill or post when they want one; and some say that they preserve their woods for considerations of sentiment alone—that they like to see the trees, and to walk among them sometimes.

Estimates of the amount of profit from forest-lands vary, from nothing, as above, to ten per cent. of their value or of the whole sum invested. In some regions, where the soil is good and the growth of timber is consequently rapid, and where some local industry supplies a brisk market near at hand, some owners think their woodlands yield a profit of ten per cent. In other parts of the state, where all the conditions are less favorable, profits are estimated at one, two, three, four, five and six per cent. But the truth appears to be that there is very little accurate knowledge on the subject. I have found the widest possible differences between the estimates of men living in the same neighborhood, and even in regard to the same tract of woodland; some intelligent and experienced woodsmen affirming that it was worth six per cent., while others said of the same land that it would not be worth having as a source of income, even as a gift, and that woodland is an undesirable kind of property.

Very few, if any, owners have kept such accounts of the yield of the various products of their woodlands as would be necessary for the determination of the question of the amount of profit. The amounts named above are estimated only. It would of course be of great service to the country if a few owners would keep accurate records of all cost and expenditures, on the one hand, for certain definite measured areas of forest, and, on the other, a complete account of all receipts of every kind. This would have to be continued at least through the whole term of the life of one generation of trees—that is, from the time when one growth of the timber is cut off until the next growth reaches maturity, and is, in its turn, all cut off and marketed. Such a record would have great interest and value as a contribution to our knowledge of economic forestry. Who will begin and continue it?

FOREST-FIRES.—Forest-fires are the greatest cause of injury to the forests and woodlands of New Jersey. In all parts of the state where there are large tracts of woodland the value of this kind of property as an investment has been seriously diminished by the liability to great damage or almost complete destruction of the woods by fires. Each successive burning of a forest impoverishes the soil more and more, and its capacity for reproducing a valuable growth of timber is thus gradually diminished, and in time almost completely destroyed. If any plan could be devised for the effectual protection of the woodlands of the state from fire their value would at once be greatly increased. The question how to defend the forests from fire is in this state, as in some other parts of our country, the most urgent of all our forestry problems. It does not seem likely that we shall obtain much help from legislation.

A considerable proportion of the most destructive fires are started by sparks from railway locomotives. There are several kinds of spark-arresting appliances which would, in part at least, prevent the escape of burning cinders from the engines, but the railroad people object to their use on the ground that they lessen the speed of their trains. Some of the railroad companies keep the whole breadth of their "right of way" clear of trees and bushes, and plow a narrow strip at the edge of it, on each side. This is a valuable precaution, and doubtless prevents many fires. But a high wind sometimes carries sparks beyond this barrier into the dry woods, and thousands of acres are burned over before the fire runs its course. In such cases it would be a good plan for the owners of forest-lands on each side of the railroad to clear a narrow zone all along the front of their property, and plow it every year, so as to prevent the possibility, under ordinary conditions, of fire being blown into the woods from passing engines.

This suggests the only means for preventing the unlimited or indefinite extension of forest-fires which would be at once practicable and effective. This is the plan of clearing and plowing narrow lanes through all large bodies of forest, at regular distances apart, at every mile, for instance, crossing each other at right angles, thus dividing the woodlands into protected blocks, each a square mile in area. The wood thus cut out, when not too remote from market, would probably pay the cost of the work of clearing these lanes at first; but where this is not the case, the expenditure would be returned many times over in the rapid increase in value of the woodlands of the state which would result from their comparative security from the ravages of fire. It is often observed that an old woods-road, having only the breadth of a single wagon-track, is sufficient to stop the progress of a forest-fire, and it is altogether probable that a lane, forty or fifty feet wide, kept clear of trees and bushes, and with one-half of its breadth plowed every year, would nearly always be found an effective barrier. If this should prove to be true in practice, then a system of such lanes, crossing the woods in opposite directions a mile apart, would have the effect of confining each particular fire within the limits of the square mile on which it is started, and the damage in each case would be comparatively slight. The proper breadth for such lanes, and their number, would be determined by practical experiment, as their value would be demonstrated by use.

The greatest obstacle in the way of the adoption of such a plan for forest protection is probably a certain indisposition on the part of the owners of woodlands to do new and untried things, a kind of inertia which is common to all classes and conditions of men. If some energetic owner of a large tract of woodland would put this plan into operation, his example would probably soon be imitated by others. It would be comparatively easy of application in the level regions of southern New Jersey, but its use would be more difficult in the mountains and highlands of the northern part of the state. Until some such practical method is adopted the progressive devastation and ruin of the forests in this state by fire will probably proceed unchecked.

Franklin Falls, N. H. *J. B. Harrison.*

The Western New York Horticultural Society.

Annual Meeting at Rochester.

THIS Society is one of the strongest in the country, and its deliberations have always been of the highest order. The meeting last week was equal in every respect to the best that have preceded it, and it might well serve as a model for similar gatherings. It was well attended by intelligent and interested members and visitors. The papers were carefully prepared by experts in the subjects treated. The discussions were always pithy and practical. Business was dispatched with rare order and promptness. Each session began at the precise moment named on the schedule, and the interest never flagged for an instant until the close. Our report of the meeting is necessarily limited to a condensed summary of some of the addresses and discussions, but the proceedings were instructive from beginning to end. The venerable Patrick Barry, who for twenty years has served most efficiently as President of the Society, was unable to preside; but he sent a donation of $2,000 as the nucleus of a fund whose income is to be used for the Society, under direction of the Executive Committee. Mr. W. C. Barry presided and read the President's Address, which was a record of horticultural progress during the year, and in spite of the depressed prices of staple fruits, it was hopeful in tone, as the following extract will show:

We hear a good deal about low prices, overproduction of fruits, and all that. This is nothing new; the same cry was not uncommon twenty or thirty years ago. In my opinion, prospects were never better. The consumption of fruits is increasing wonderfully all over the world, but it is natural that as we advance more regard should be paid to the quality of fruits and the manner in which they are placed in the market. The slovenly fruit-grower must go!

THE CHAUTAUQUA VINEYARDS.

This was the subject of a paper by Mr. A. S. Watson, who described the Chautauqua Vineyard district as extending for about forty miles along the south-easterly shore of Lake Erie, and towards the south reaching half way up the range of hills whose summits are from three and a half to five miles from the lake-shore, to which they run parallel. The surface of the district is gently rolling or level and never precipitous, and no section of the country of equal width can show greater diversity of soil. The strip along the lake is a sandy loam, easy to cultivate, quickly responding to fertilizers, and generally underlaid with clay. It varies from half a mile to a mile in width. It is considered inferior for farming purposes, is cheaper than the adjacent land, and its merits for grape-growing have been but recently recognized. Its advantages are ease of cultivation and capacity to withstand drought, while grape posts are more durable here than in the gravelly loam. Grapes produced here have a finer bloom, more compact clusters and better keeping qualities, but are later in maturing than on the next belt. The vines, too, are less susceptible to winter injury. South of this is a strip of gravelly loam, a stronger soil, more valuable for farm crops. It is a warm soil, and the rapid growth of weeds makes it more difficult of cultivation. It yields enormous crops of fruit and is more susceptible to the effects of drought. It matures crops earlier, and, therefore, is preferable for early varieties. Still south of this on the hill-slopes is a narrower strip, with a soil principally of clay, and the few vineyards planted here produce a good yield of excellent quality. The Catawba, Delaware and Isabella do better on this land than they do nearer the lake. The soil is not easily tilled, but the grapes have a beautiful bloom, ripen early, and have the best keeping qualities. Nine-tenths of the land in these three belts is well adapted to vineyard planting, but not one acre in forty is yet planted, and scarcely two-thirds of the vines planted have come into bearing. That is, thirty-nine-fortieths of the land is now devoted to farm crops, and the visitor riding along one of the perfect roads that traverse the district would naturally inquire, "Where are the Chautauqua vineyards?" And yet 700 car-loads of grapes were shipped from this region last season, which paid $100,000 in freights to the railroads. Two and a half million ten-pound baskets were required to market the crop, and they cost $75,000. For the young vineyards fifty car-loads of wire will be needed next spring, $5,000 worth of manilla rope will be needed for tying the vines, and about ten million vines will be propagated. The Concord leads all other varieties, largely in the number propagated, and following this in the order of recognized merit come Worden, Moore's Early, Pocklington, Niagara, Delaware, Brighton, Agawam, Lindley, Salem and Catawba. A new variety, the Moyer, is attracting much attention. It is hardy and healthy, resembling the Delaware in foliage, size and quality of fruit, and is earlier than Moore's Early. A large percentage of the labor in the Chautauqua vineyards is done by women and girls. Tying up the vines in spring, and harvesting the crop in the fine autumn weather, is invigorating rather than exhausting work, and of the thousands of women and girls who begin to gather the crop in September and continue the work for six weeks or two months, few leave without gaining in strength, and from fifteen to thirty pounds in weight. Several vineyards are successfully managed by women. It would seem that for women left with families and a capital of from $2,500 to $5,000, and dependent upon the income secured from this investment and upon their own resources for a livelihood, no more promising occupation can be suggested. A vineyard of five or six acres, in full bearing, with a comfortable cottage and packing house, can be secured for $2,500.

FERTILIZERS.

Professor Caldwell, of Cornell University, began by stating that if dilute manure-water or water in which the three most important elements of plant-food—potash, phosphoric acid and some compound of nitrogen—had been dissolved, were passed through a stratum of pure, clean sand, it would come out as rich in all these ingredients as when it was poured upon the surface; but that if the same water was filtered through ordinary tillable loam, it would be found almost colorless and odorless, and analysis would show that the nitrogen, phosphoric acid and potash had been taken up and were held by the soil. Now, if clear water should be again poured through this soil scarcely any of the sulphate of ammonia, the phosphate or the potash would be removed. It would require 100 gallons of pure water to wash out of the soil what was left there by passing through it a single gallon containing this fertilizing material in solution. This property by which plant-food is fixed in the soil is of great advantage, and enables the farmer or gardener to manure when he will, with the assurance that the land will hold the plant-food till it is needed by the plant. For, although it cannot be washed out by water, the plant carries its own solvent, or the key to unlock what has been fixed in the soil for its use. A solution of plant-food can easily be too rich for the plant's use, but we need not fear, under ordinary conditions, any excess of fertilizer, for, when locked in the soil, it is only delivered to the plant in such quantities as are required. One form of nitrogen, however, and the form which it generally passes into when taken by the plant—namely, the nitrates—is not fixed in the soil, but can be dissolved out by rain so as to pass off in the drainage-water. The natural caution, therefore, in case the nitrates are used, is to apply them when the plants need them. That is, do not top-dress with nitrates in autumn for spring crops, and use small and frequent applications rather than apply the entire amount needed at once. While in a general way the farmer can put all the manure he has to spare on his land or in it, and then forget it till the crop comes to take it as necessity requires, with nitrogen he must be watchful, and always have a plant ready to catch it when nitrification takes place.

Professor Caldwell was followed by Joseph Harris, who made a most suggestive address, in which he urged upon fruit growers and gardeners the advantages of using more nitrogen and using nitrates as the cheapest and most available forms of this element. Gardeners, he said, should use more commercial fertilizers, instead of bidding against each other for stable manure, which is a by-product, with a price controlled entirely by the demand. The profit of using nitrogen, for example, depends upon the value of the crop. Consumers refused to take the chemists' valuation of food stuffs, but consulted their tastes. For the support of life the carbohydrates in corn might be worth as much as the same nutrients in peaches. But while these elements in corn were worth $30 a ton, they were worth $500 a ton in peaches. It might not pay to use nitrate of soda on meadows when the carbohydrates in hay were worth $30 a ton, and yet it might be profitable to use nitrate on strawberries where these nutrients were worth $750 a ton. It had been stated that nitrates would not pay in the peach orchard, and they would not pay when other crops were grown among the trees. Indeed, it was conceivable that nitrates might injure the peach crop where they were

allowed to encourage a rank growth of weeds, which drank up the moisture needed by the trees. He had used nitrates with success for peaches. He did not believe they encouraged a weak, spongy growth of the trees that would suffer in winter. If applied early, the trees would make a strong, early growth, which enables them to ripen their wood well and produce abundant fruit buds. As fruits and vegetables are improved in quality they need richer land, just as improved varieties of live stock repay for the best of treatment. Beyond any question, early vegetables need nitrates before the warm weather comes, when nitrification goes on more rapidly in the soil. As a matter of practice, he found no loss from applying the nitrates he needed at a single application, for summer rains did not fall in sufficient abundance to wash the fertilizer out through the drains. The so-called "complete fertilizers" in the market did not contain enough nitrogen in available forms, and as it had not been demonstrated that plants took up this element to any great extent in other forms than that of nitrates, he advised the use of nitrates directly, and, fortunately, nitrogen could be bought more cheaply in this form than in any other. He did not counsel the indiscriminate use of nitrate of soda, although he used it largely and with profit. But he thought that no gardener or fruit-grower could afford to neglect making a careful trial of this fertilizer.

FUNGUS DISEASES OF PLANTS.

Professor A. N. Prentiss, of Cornell University, in his report as chairman of the Committee on Botany, gave a summary of the losses to fruit growers in the different counties from plant diseases. These losses were comparatively light during the past year, and yet in the aggregate they amounted to hundreds of thousands of dollars. Professor Prentiss considers these diseases more dangerous foes than destructive insects. Concerning a large proportion of them our information is limited, and we have few remedies that can be trusted. Not only is the fruit destroyed by parasitic fungi, but the plants and trees are robbed of the vitality necessary to the production of remunerative crops. Decreased vigor in the plant means lessened profit from its fruit. Careful study and experiment in this special field by men of scientific training, is one of the most urgent needs of horticulture. Recent investigation of the black rot of the Grape by agents of the general Government seem to prove that copper sulphate can be successfully used as a preventive of this disease, and the same substance will check the growth of the downy mildew of the Grape leaf. Flowers of sulphur is the best known remedy for the powdery mildew of the vine. The apple fruit-scab not only disfigures the fruit and often makes a large proportion of it unmarketable, but the same fungus attacks the leaf, weakening the tree, so that even if the fruit escapes the scab it is small and imperfect. Experiments by Mr. E. S. Goff point to spraying with a solution of soda hyposulphite and potassium sulphide as hopeful treatment of this fungus. But for black knot in the Plum, which has caused the total loss of many orchards, cutting away the affected parts as soon as the disease appears, and burning them, is the only safe course known. It is now agreed that Pear blight is a bacterial disease, but no remedy has been suggested for it except the amputation of the affected limbs. Peach yellows is the cause of loss beyond computation every year, but almost nothing is known of its origin or character, and no remedy for it has been found. Professor Prentiss continued through a long list of rusts and blights which preyed upon small fruits, chiefly to enforce the lesson that research of the most thorough and patient kind is needed before fruit growers will be able to meet these diseases with any feeling of confidence that their ravages can be arrested or controlled.

THE CULTIVATION OF THE PLUM FOR MARKET.

Mr. S. D. Willard, of Geneva, read a most instructive paper on this subject, in which he insisted that success can only be gained when good trees of varieties suited to a particular location are selected; when these varieties are adapted to the local market; when the orchard is carefully cultivated and liberally fed, and when constant watchfulness is exercised against the attacks of insects and diseases. The Plum is capricious in its likes and dislikes, and very often a variety which does well in one locality will fail a few miles away on soil of apparently the same kind. Markets are quite as variable. In one, Damsons are more highly prized than choicer sorts, while in a neighboring town colored varieties are required to the exclusion of all others. The selection of varieties therefore depends on the proper solution of very many problems, and yet these points which are vital to success must be settled beforehand by the planter from such observations and information as are within his reach. To the inquiry, then, what varieties should be planted for profitable orchard culture, Mr. Willard can only reply that the Lombard, Reine Claude, Quackenboss, Bradshaw, Purple Egg, Gueii, German Prune, French Damson, Peter's Yellow Gage and Copper have proved among the best for his soil and market, while of the newer sorts Stanton is one of much promise.

Against the curculio the jarring process has proved satisfactory. If spraying with the arsenites is tried, care should be taken to use a solution as weak as possible, because the foliage of the Plum is easily injured. The green aphis is often more destructive than the curculio even, sometimes defoliating entire orchards. Professor Cook feels certain, however, that the kerosene emulsion dashed forcibly upon the tree by a pump through one of the new spraying nozzles will overcome this pest. The orchard should be carefully inspected as often as twice a year for the black knot, and on its first appearance the limb should be cut off far below the diseased point. Good culture and an enriched soil will prove helpful against leaf blight. The plum is perishable, so that careful preparation for market is essential, and when the fruit is to be sold from retail stands it should be picked with stems adhering, closely sorted and carefully laid in five to eight pound baskets. Other things being equal, a clay loam is the best soil for Plums. Cultivation of the orchard should begin early and should not be deep. The new growth of thrifty trees should be cut back to one-half every year in vigorous trees, and no thinning out of the branches is needed. For home use Mr. Willard named as choice varieties, M'Laughlin, Reine Claude, Washington, Bradshaw, Peter's Yellow Gage and Stanton. The productive life of a Plum-tree averages from fifteen to eighteen years, but the Lombard, under proper cultivation, might last twenty-five years.

CANNING AND EVAPORATING FRUIT.

Mr. S. G. Curtice read a paper on the canning industry, which began in a small way a little more than thirty years ago, and has grown so rapidly that now fruits and vegetables are put up in this way not only for western mining camps and for winter use, but they are so cheaply and successfully preserved that they compete at seaside resorts and many other places with green fruits and vegetables in their season. No accurate data as to the total amount of business done by the canneries of the country are available, but the estimates made were so enormous that Mr. Curtice refrained from giving the approximate figures. In his own establishment last year $236,000 were paid for fruits, $70,000 for tin, $14,500 for sugar and $68,000 for labor. As to complaints of the overproduction of fruits, Mr. Curtice said that he never could obtain as much as he wanted of choice kinds—fruits of a particular color or flavor. He had given $80 for the fruit on a single White Cherry tree, and more profit was often realized by the owners of a few trees in a city lot of Rochester than was yielded by many acres of farm land.

The evaporating industry is still younger, having begun in western New York some fifteen years ago. Mr. M. J. Doyle, who read a paper on this subject, stated that within forty miles of Rochester there were nearly 2,000 fruit evaporators, besides many small dry-houses on farms, and the business was still rapidly growing. Of apples alone, 25,000,000 pounds were evaporated here, and the total dried product of all kinds of fruits amounted to 37,750,000 pounds, for which producers received $1,485,000. More than 4,000,000 pounds of dried fruit were exported from this region last year, and Rochester fruit is in demand at such remote markets as Australia.

NEW VEGETABLES.

Mr. E. S. Goff made a report on the new vegetables offered by the leading seedsmen of the country last spring and tested at the Geneva Experiment Station. Of Beets, Lentz Turnip (Bragg) is a strain of the old Bassano, as early as the earliest; the New Market Garden (Iowa Seed Company), a short, conical variety, of large size and quick growth, is not as early as Egyptian or Eclipse, but yields a larger crop than either. Mitchell's Perfected Carrot (Gregory) is hardly distinct from the Coreless Red, but it is worth notice as being of good size, fine form, almost as thick at the bottom as at the top, and without the pithy core found in most of the larger varieties. Among several excellent new varieties of Cabbage, Marvin's Savoy (Hallock) yielded twelve heads from twelve plants averaging nine inches in diameter and weighing six pounds each. This is an extraordinary production for the Savoys, which are decidedly superior to common cabbages in table qualities. Dreer's Earliest Snowstorm and Gilt Edge Snowball (Thorburn) lead the list of Cauliflowers in point of productiveness and neatness of the heads. None of the Sweet Corns were superior to older sorts, but the Ruby Sugar (Rawson), a tall variety

which continued to furnish boiling ears of the sweetest quality from August 10th until frost came on October 11th, would be a valuable acquisition but for one fault. Many of the ears have a dark red cob, the juice of which produces an almost indelible stain upon table linen or upon the hands. Emerald Gem (Henderson) and Perfection (Livingston) were the finest Musk Melons tested, all things considered. Two new Okras proved desirable varieties for the Northern States. These were Little Gem (Dreer) and New Dwarf Density (Thorburn). Both were early, dwarf and bore fruit of uniform size. Child's Celestial Pepper (Gregory) is distinct and attractive, remarkably productive, and as the plant bears both red and yellow peppers at the same time, it is quite ornamental. Among Squashes, the Sibley (Sibley & Rawson) and the White Chestnut (Gregory) are valuable additions to the old list, and the former is likely to prove a formidable rival of the Hubbard. Probably the most important novelty of the year is the Dwarf Champion Tomato (Henderson). The plant is dwarf and compact, with foliage little subject to rust, and fruit is smooth, uniform in size and of excellent quality. Of eighteen new varieties of Potato tested, the Rural New Yorker No. 2 gave the largest yield. *Stachys tuberifera*, the so-called new vegetable from northern Africa, was tested, and yielded small, fleshy tubers, which only attained the size of acorns. Its table qualities were not tried.

Besides the papers already mentioned, Mr. Geo. B. Ellwanger contributed one on "Hardy Herbaceous Plants;" Mr. George Savage read one on "Roses for Winter Forcing;" Mr. William Webster spoke of "Improvements in Farmers' Homes;" Mr. Charles S. Little discussed the "Cultivation of Aquatic Plants," and Professor A. J. Cook gave a practical address on "Insecticides."

The exhibition of fruit was notably good. Ellwanger & Barry alone showed sixty-three varieties of apples and thirty-six varieties of pears, while other members contributed almost as many more. No finer Fameuse, Fallawater or King apples were ever seen, and the plates of Anjou, Winter Nelis and other pears could hardly be excelled. One Anjou pear weighed twelve ounces. Mr. Barry showed eighteen varieties of hardy grapes, among them early varieties, like Brighton, and all were in capital condition. Several of Roger's Hybrids, Eumelan, Niagara, Jefferson and Vergennes, were included in the collection. Grapes have kept so well this year, that Catawbas were selling in Rochester for a lower price than at any time since they first ripened.

Cook's fruit-gatherer is a new machine, which was strongly recommended to all who have orchards of any considerable extent. Not only are apples and pears gathered much more cheaply with this implement—for about one-half the cost of hand-picking—but much time is saved, which is an important item. Apples often increase in size just as they approach the ripening point, and the gain in quantity, not to speak of quality, when the fruit is allowed to remain until its full growth is reached, is worth considering. This machine does its work so rapidly that the fruit-grower can wait until the fruit matures before beginning to harvest the crop, and several members asserted that such an implement is as necessary to Apple-growers as is a mowing-machine or reaper to farmers.

As an evidence of increasing interest in Peach culture in western New York, it was stated that Mr. J. F. White, of Mount Morris, has an orchard of 22,000 trees, covering 145 acres. The varieties with which Mr. White has had the most success are Waterloo, Alexander, Early Rivers, Mountain Rose (the earliest freestone), Fosters, Early Crawford, Oldmixon and Late Crawford.

Notes.

Erica carnea and *Daphne Mezereum* were blooming in the open ground in the Arnold Arboretum on the 19th of January.

The bean of the *Soja hispida* is in as great demand in Japan as our garden Beans are here; but though it has been introduced, and re-introduced, over and over again, to American gardens, it fails to meet popular appreciation. A little money buys a good deal in Japan, but the crop of Soja Beans in Japan last year is represented by $20,000,000.

A remarkable Orchid, still in bloom at Rose Hill nurseries, is a white variety of *Lælia Pattinii*, so-called. There is some uncertainty as to the identity of this plant; it is supposed by some authorities to be a winter-blooming form of *Cattleya Skinneri*, which it strongly resembles. The colored variety was introduced some two or three years ago, but this white form appeared in a consignment imported by Messrs. Siebrecht & Wadley.

The showy Yellow Broom (Genista) is now being grown largely for Easter decorations, and increased demand is reported. Pot-plants, well grown, make a mass of bloom highly effective among other plants, and it usually pays the grower better to sell it in this form than to cut the flowers.

Under the modest title of Botanical Notes, Mrs. Mary K. Curran, the curator of the botanical section of the California Academy of Sciences, contributes to its Proceedings a paper (now issued separately) containing a large amount of varied and important information upon a number of California plants, derived, for the most part, from personal observations made in the field.

Styrax Obassia has not yet, we believe, flowered in American gardens, though the plant itself has been considerably distributed. The leaves are as large as those of the Witch-Hazel, and the flowers are of corresponding size. Like the ordinary Snowdrop-tree or Halesia, to which it is related, the flowers are white, with the addition of a grateful perfume. It flowered last year in England.

The cork trade in Spain was unusually good last year, the exportation to other parts of the Continent, as well as to England and America, having been greater than for several years past. The demand has been the greatest for the superior kinds of corks, such as those for champagne bottles. Gerona is the most important centre in Spain for the production of cork, hundreds of cork manufactories being scattered over the province. In the town of Palamos there are forty. From St. Felin de Guixols it is reported that the Cork trees have been suffering from the attacks of a pest which threatened to destroy them. A voracious caterpillar or worm has been attacking the Cork forests in millions during the past year or two. In a very short space of time it stripped the trees of all their leaves completely. These worms are now in their turn said to be attacked and devoured "by another insect, a species of beetle of a dark green color, and armed with a horn, with which it cuts the worms up. Still another insect, in the form of a crab (*cangrejo*), pursues the worms and destroys them; and thirdly, when the caterpillar has passed through its metamorphosis, and the butterflies have deposited their eggs, a third insect, until now unknown, attacks and pierces the bags containing the new germs, and destroys them; all of which will contribute, no doubt, to the complete extinction of these destructive caterpillars."

The competition annually opened to young designers by the Architectural League of New York dealt this year with "A Tomb for a Distinguished Architect." The competitive drawings have recently been displayed at the exhibition held by the League, and it was pleasant to see how much good taste, as well as scholarly accomplishment, they revealed. The design by Mr. Brite of this city, which gained the gold medal, was adapted to a site such as frequently presents itself in American cemeteries—a low hill-side crowned with trees; and his scheme showed an Ionic façade with angle-piers and two intermediate columns—behind which stood a large sarcophagus—fronting on a finely designed platform, with encircling seats backed by a retaining wall against the sloping bank. The silver medal fell to Mr. Enders, of Chicago, who showed a charmingly simple and dignified isolated mausoleum, without columns, but with steps and a seat-encircled platform in front. Both these designs, and all the best ones among the seventeen that were shown, adhered to classic types—a noteworthy and a promising fact in these days when Romanesque art so strongly attracts our artists. Although Romanesque art is undoubtedly better fitted than any other for many kinds of modern buildings, it is difficult to secure with it just that expression of combined dignity, refinement, quietness, simplicity and delicacy which is especially desirable in a tomb. Nor does an adherence to classic types necessitate monotony in form or feature. The drawings now in question were sufficient to refute such an idea, for there was much diversity, even between those which were most "scholarly." When we reflect that no work had been admitted into this competition by men more than twenty-one years of age, its results were extremely promising; and for several of the designs one may heartily wish realization in more solid material than pen and paper. Still more interesting than any one of them, however, was a design not in the competition, which had been prepared by Mr. St. Gaudens and Mr. Page Brown. It showed a temple-like structure with a projecting pediment borne by twelve caryatids, arranged in three rows of four each, which had been given the shape of winged angels. Here, Christian sentiment had been significantly displayed; yet the result was truly classic in feeling, and, executed as this sculptor could execute it, would be of wonderful beauty.